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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,218	10/15/2003	Joseph Peter Robert Tosey	034300-415	8112
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<div>7590 05/02/2007</div>			<div>EXAMINER MYINT, DENNIS Y</div>	
			<div>ART UNIT 2162</div>	<div>PAPER NUMBER</div>
			<div>MAIL DATE 05/02/2007</div>	<div>DELIVERY MODE PAPER</div>

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/687,218	TOSEY, JOSEPH PETER ROBERT	
	Examiner	Art Unit	
	Dennis Myint	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-206 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-206 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 22, 2007 has been entered.
2. Claims 1-206 are currently pending in this application. In the amendment filed on March 22, 2007, claims 1, 45, 89, 133, 147, 165, 175, 180, 188, and 193 were amended. Claims 1, 10, 13, 17, 18, 21, 25, 28, 29, 32, 36, 37, 40, 44, 45, 54, 57, 61, 62, 65, 69, 72, 73, 76, 80, 81, 84, 86, 89, 98, 101, 105, 106, 109, 113, 116, 117, 120, 124, 125, 128, 132, 133, 142, 146, 147, 151, 154, 155, 159, 160, 164, 165, 174, 178, 179, 183, 186, 187, 191, 192, 196, 197, 199, 201, 203, and 205 are independent claims.
3. In light of the amendments made, rejection of claims 1-9, 89-97, and 133-141 under 35 U.S.C. 112 First Paragraph is hereby withdrawn.

Response to Arguments

4. Applicant's arguments filed on February 21, 2007 have been considered but are not persuasive.

Referring to claim 1, Applicant argued that *Li in view of Welch* does not teach or suggest creating on a wireless device a keyword string database having one or more bit vectors and a reference to one or more candidate strings (Applicant's argument, Page 61 Lines 14-16). In response, it is pointed out that *Li in view of Welch* teaches said limitations as follows.

Li teaches the limitations:

"determining one or more candidate keyword strings to store in said database (*Li*, Column 6 Line 40-50, i.e. "valid lexicon strings (such as legal and correct city names)..");

"creating one or more bit vectors based at least in part on said one or more candidate keyword strings" (*Li*, Column 6 Line 40 through Column 9 Line 35), said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings" (*Li*, Column 9 Line 39 through Column 13 Line 62); and

"storing said one or more bit vectors" (*Li*, Column 7, Line 1-3, i.e., *Signature Vector*) and "a reference to said one or more candidate keyword strings in said database" (*Li*, Figure 2, *Store pointers to Lexicon Entries in Bucket Address Table 240*).

Welch teaches the following limitation, "a method for creating a keyword string database on a wireless user device" as *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data*; Figure 1: 20; Paragraph 0025, i.e., *In other embodiments, the user may store the textual data in the wireless terminal 20 for future reference*; and Paragraph 0026, i.e., *In some embodiments, the textual data may be searched for the name of a television show, a person's name, a telephone number or logical network address, a text string that may be identified by a user, program instruction, and/or software code* in Paragraph 0026.

Therefore, Li in view Welch teaches all the limitations of claim 1 and Applicant's arguments are invalid.

5. Applicant additionally argued that *No teaching or Suggestion to combine Li and Welch* (Applicant's argument; Page 63 Line 18). In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, one would have been motivated to do so in order to enable users to store the textual data on a wireless device and search said textual data using keywords (Welch, Paragraphs 0025-0026).

Referring to claim 2, Applicant argued that *the Applicant respectfully disagrees with the Examiner's statement that Li inherently disclosed wherein said bit vector further comprises at least one bit that represents a non-alphanumeric symbol* (Applicant's argument, Page 64 Lines 18-20). In response, it is pointed out that Li teaches non-alphanumeric symbols in Column 6 Lines 43-47 as *All lower case letters were mapped to their upper case letters, all between word spaces are stripped, and all non-alphanumeric characters are mapped to a selected specific non-alphanumeric characters (for example, "?")*.

As per Applicant's argument regarding claim 10, please see Examiner's response to claim 1 above. As per Applicant's argument regarding claim 16, please see Examiner's response to claim 1 above. As per claim 16, Applicant is pointed out that Li in view of Welch teaches the limitation of claim 16, *"wherein said comparing is independent of the order of keyword prefixes in keyword strings"* (Li, Column 8 50 through Column 9 Line 59). Note that, in the method and system of Li, *between-word spaces in input strings are stripped* (Column 6 Line 40-50), said input strings are partitioned and hashed, then formed into bi-gram bit vectors and finally transformed into a signature vector (Li, Column 6, Line 40 through Column 7 Line 3). As such, the method of Li is capable of compare input string independent of the order of keyword prefixes.

As per Applicant's argument regarding claim 17, please see Examiner's response to claim 1 above. As per Applicant's argument regarding claim 18, please see Examiner's response to claim 1 above. As per claim 25, Applicant argued that *the cited*

references do not disclose or suggest determining a relative frequency of use for at least one symbol in a language (Applicant's argument, Page 71 Lines 8-10). In response, it is pointed out that Li teaches the limitation of claim 25 as "determining a relative frequency of use for at least one symbol in a language (Li, Column 7 Line 4-40, i.e. "frequency table").

As per claim 26, Applicant argued that *the cited references do not disclose or suggest wherein said assigning further comprise assigning each of said at least one symbol to one of a plurality of so as to minimize the difference between sums of statistical weightings for symbols comprising each groups in said plurality of groups* (Applicant's argument, Page 72 Lines 18-25). In response, it is pointed out that Li teaches said limitation in column 7 Lines 4-40 as *The same sequence of bi-grams (AA-AH, AI-AP, . . .) occurs in the signature vector of every lexicon entry. Prior to the static processing of the lexicon, these signature vector bits may be ranked. A counter is accumulated for each of the 85 bits, counting the frequency at which each bit (considering the 8 bi-grams for each bit) occurs in the lexicon. The 85 bits are then sorted in descending order by their corresponding frequencies, starting with the largest counter value (set of bi-grams most frequently found in the lexicon). The sorting process results in a bit frequency table which is then used in the manner described below to partition signature vectors of lexicon entries and also of unverified strings. Referring now to FIG. 4B, the signature vector 25 is partitioned at step 230 into seven groups 30-36 of 12 bits each, g.sub.i,1 . . . g.sub.i,12, where i=1-7, as shown in FIG. 4B. The last (85th) bit of the signature vector is discarded. In the partitioning process, the first*

group ($i=1$) is assembled **using the bit frequency table for the lexicon**. A bit mask is created having twelve bit positions corresponding to the twelve most frequently occurring bits, that is, those bits at the top of the bit frequency table. To partition the signature vector of **a particular lexicon entry**, the same bits are compared to the bit mask. Only if the bit is set to "1" in the entry's signature vector is the corresponding bit of the first group set to "1." For example, if bit no. 2 (A1 through AP) contains the bi-grams having the most frequent occurrence in the lexicon, bit g.sub.1,1 will be given a value corresponding to bit 2 of the entry's signature vector. That is, if any of the bi-grams A1 through AP are set in the bi-gram vector, bit 2 of the entry's signature vector will have been set, and bit g.sub.1,1 of the **first group** of the entry's partitioned signature vector will be set. The same process is used to assemble the other bits of the first group, and then the bits of the other six groups. Thus, the first group gives the best feature subset (bit positions in a signature vector) based on the statistics on a given lexicon, **the next group** gives the second best subset, and so on.

As per Applicant's argument regarding claim 27, please refer to Examiner's response to claim 25 above. As per Applicant's argument regarding claim 28, please refer to Examiner's response to claim 1 above. As per Applicant's argument regarding claim 29, please refer to Examiner's response to claim 10 above. As per Applicant's arguments regarding claims 21 and 32, please refer to Examiner's response to claim 1 above. As per Applicant's argument regarding claim 35, please refer to Examiner's response to claim 16 above. As per Applicant's argument regarding claim 37, please refer to Examiner's response to claim 1 above. As per Applicant's argument regarding

claim 40, please refer to Examiner's response to claim 1 above. As per Applicant's argument regarding claims 45, 46, 54, 57, 60, and 61, please refer to Examiner's response to claim 1, 2, 10, 13, 16 and 17 above.

As per Applicant's argument regarding claims 3-9, 47-53, 91-97, 135-141, and 167-173, please refer to Examiner's response to claim 1 above and prior office actions for rejection of said claims under 35 U.S.C. 103 (a). As per Applicant's argument regarding claims 11-12, 14-15, 19-20, 22-23, 30-31, 33-34, 38-39, 41-42, 55-56, 58-59, 63-64, 66-67, 74-75, 77-78, 82-83, 85-86, 99-100, 102-103, 107-108, 110-111, 118-119, 121-122, 126-127, 129-130, 143-144, 148-149, 156-157, 161-162, 175-176, 180-181, 188-189, and 193-194, please refer to Examiner's response to claim 1 above and prior office actions for rejection of said claims under 35 U.S.C. 103 (a).

As per Applicant's argument regarding claims 44, 88, 132, 164, and 196, Applicant argued that *Lin in view of Welch and further in view of Vagonzzi does not disclose or suggest said searching comprising, for each of said elements of said hierarchy ... saving said input key word string* (Applicant's Argument Page 84 Last Paragraph). In response, it is pointed out that Lin in view of Welch and further in view of Vagonzzi teaches said limitations as "receiving a hierarchy, elements of said hierarchy comprising intermediate nodes and leaf nodes representing one or more keyword strings comprising one or more words comprising one or more symbols" (Vagonzzi, Figure 2, Column 5 Line 44 through Column 6 Line 10, i.e. "The indexes 30 are actually collections of keys stored in a B-tree.");

Art Unit: 2162

"creating hierarchy bit vectors corresponding to said one or more keyword strings in said hierarchy" (Vagonzzi, Figure 2, Column 5 Line 44 through Column 6 Line 10, i.e. "The indexes 30 are actually collections of keys stored in a B-tree."));

"searching said hierarchy bit vectors for a match with said input keyword string" (Vagonzzi, Column 10 Line 40 + , i.e. "Query Processing the Indexes"), "said searching comprising, for each of said elements of said hierarchy: saving said input keyword string; applying a logical "AND" operation to the bit vector of the element and a bit vector based at least in part on said input keyword string" (Vagonzzi, Column 11, Line 1-27, i.e. " then searches the appropriate index for those target keys, starting with the lowest key.....), "said applying producing a result" (Official Note: a search always returns a result); "if said result is nonzero, removing from said input keyword string any words in said input keyword string that are prefixes of words in the element" (...If no key is found, a bit vector of all zeros is returned. If a matching key is found in the index, then the associated link is used to obtain a bit vector for that key...."); "if said input keyword string is empty, adding said element to a list of matched items" ((...If no key is found, a bit vector of all zeros is returned. If a matching key is found in the index, then the associated link is used to obtain a bit vector for that key...."); and "restoring said input keyword string; and rendering said list of matched items" (Vagonzzi, Column 11, Line 1-27).

As per claim Applicant's arguments regarding claims 88, 132, 164, and 196, please see Examiner's response to claim 44 above.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 25-27, and 69-71 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 25-27 fail to produce tangible results and therefore is not statutory. This claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract idea, naturally occurring article/phenomenon) since it fails to produce a tangible result. Specifically, the claimed subject matter does not produce a tangible result because the claimed subject matter fails to produce a result that is limited to having real world value rather than a result that may be interpreted to be abstract in nature as, for example, a thought, a computation, or manipulated data. More specifically, the claimed subject matter provides for "comparing keyword strings on a wireless user device". However, comparing keyword string alone does not produce tangible results. This produced result remains in the abstract and, thus, fails to achieve the required status of having real world value.

Claims 26 and 27 depend on claim 1 and are therefore rejected under 35 U.S.C. 101.

Claim 69-71 fail to produce tangible results and therefore is not statutory. This claimed subject matter lacks a practical application of a judicial exception (law of nature,

abstract idea, naturally occurring article/phenomenon) since it fails to produce a tangible result. Specifically, the claimed subject matter does not produce a tangible result because the claimed subject matter fails to produce a result that is limited to having real world value rather than a result that may be interpreted to be abstract in nature as, for example, a thought, a computation, or manipulated data. More specifically, the claimed subject matter provides for "comparing keyword strings on a wireless user device". However, comparing keyword string alone does not produce tangible results. This produced result remains in the abstract and, thus, fails to achieve the required status of having real world value.

Claims 70 and 71 depend on claim 1 and are therefore rejected under 35 U.S.C. 101.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 1, 2, 10, 13, 16-18, 21, 24-29, 32, 35-37, 40, 43, 45, 46, 54, 57, 60-62, 65, 68-73, 76, 79-81, 84, 87-90, 98, 101, 104, 105, 106, 109, 112, 114-117, 120, 123-125,

128, 131, 133, 134, 142, 145-147, 150-156, 159, 160, 163, 165, 166, 174, 177-179, 182, 183-187, 190-192, and 195 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (U.S. Patent Number 5774588) in view of Welch (U.S. Patent Application Number 2004/0097246).

Li is directed to a method for creating a keyword string database (Li, Column 6 Line 10-21, i.e., A Lexicon and An example of such a lexicon would be a list of city names in the United States, which could contain about 45,000 valid entries.), and teaches the limitations:

“determining one or more candidate keyword strings to store in said database (Li, Column 6 Line 40-50, i.e. “valid lexicon strings (such as legal and correct city names)..”);

“creating one or more bit vectors based at least in part on said one or more candidate keyword strings” (Li, Column 6 Line 40 through Column 9 Line 35), said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings” (Li, Column 9 Line 39 through Column 13 Line 62); and

“storing said one or more bit vectors” (Li, Column 7, Line 1-3, i.e., *Signature Vector*) and “a reference to said one or more candidate keyword strings in said database” (Li, Figure 2, *Store pointers to Lexicon Entries in Bucket Address Table 240*).

Li does not explicitly teach the limitations: "a method for creating a keyword string database on a wireless user device" and "said keyword string provided by a user of said wireless user device".

On the other hand, Welch is directed to "a method for creating a keyword string database on a wireless user device" and "said keyword string provided by a user of said wireless user device" (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data; Figure 1: 20; Paragraph 0025, i.e., In other embodiments, the user may store the textual data in the wireless terminal 20 for future reference; and Paragraph 0026, i.e., In some embodiments, the textual data may be searched for the name of a television show, a person's name, a telephone number or logical network address, a text string that may be identified by a user, program instruction, and/or software code*).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the method of Welch, which creates keyword string database on a wireless user device, with the method of Li, which determines keywords, creates bit vectors, and stores said bit vectors and references to said key words, so that the combined method would create a keyword string database on a wireless user device and determine keywords, create bit vectors, stores said bit vectors and references to said keywords. One would have been motivated to do so in order to enable users to store the textual data on a wireless device and search said textual data using keywords (Welch, Paragraphs 0025-0026).

As per claim 2, Li teaches the limitation:

“wherein said bit vector further comprises at least one bit that represents a non-alphanumeric symbol” (Li, Column 6 Line 43-47, i.e. *All lower case letters were mapped to their upper case letters, all between word spaces are stripped, and all non-alphanumeric characters are mapped to a selected specific non-alphanumeric characters (for example, “?”)*). It is inherent that those non-alphanumeric will be represented in the signature vector, which represents the original string. (Li, Column 7, Line 1-3, i.e., *Signature Vector*).

As per claim 10, Welch in view of Li is directed to “a method for incremental keyword search on a wireless user device” (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data; Figure 1: 20*) and teaches the limitations:

“submitting an input keyword string comprising one or more words comprising one or more symbols” (Li, Column 6 Line 10-21 and Column 8 Line 51 through Column 13 Line 62); and

“receiving in response to said submitting at least one candidate keyword string having a bit vector that matches a bit vector of said input keyword string” (Li, Column 6 Line 10-21 and Column 8 Line 51 through Column 13 Line 62).

As per claim 13, Welch in view of Li is directed to “a method for incremental keyword search on a wireless user device” (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data*; Figure 1: 20) and teaches the limitations:

“receiving an input keyword string comprising one or more words comprising one or more symbols” (Li, Column 6 Line 10-21, Column 6 Line 40 through Column 9 Line 35);

“creating a bit vector based at least in part on said input keyword string” (Li, Column 8 Line 51 through Column 9 Line 58);

“comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors” (Li, Column 8 Line 51 through Column 9 Line 36);

“applying a conventional keyword matching algorithm” (“comparing vectors”) to said at least one candidate keyword string represented by said set of matching bit vectors (Li, Column 9 Line 58 through Column 13 Line 62) ; and

“presenting any matching candidate keyword strings” (Li, Figure 2, “Output Final Candidate List” 155).

As per claim 16, Welch in view of Li is directed the method of claim 13 and teaches the limitation:

"wherein said comparing is independent of the order of keyword prefixes in keyword strings" (Li, Column 8 50 through Column 9 Line 59). Note that, in the method and system of Li, *between-word spaces in input strings are stripped* (Column 6 Line 40-50), said input strings are partitioned and hashed, then formed into bi-gram bit vectors and finally transformed into a signature vector (Li, Column 6, Line 40 through Column 7 Line 3). As such, the method of Li is capable of comparing input string independent of the order of keyword prefixes.

As per claim 17, Welch in view of Li is directed to "a method for creating a keyword string database on a wireless user device" (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data*; Figure 1: 20) and teaches the limitations:

"determining one or more candidate keyword strings to store in said database" (Li, Column 6 Line 40-50, i.e. "valid lexicon strings (such as legal and correct city names).....");

"creating one or more bit vectors based at least in part on said one or more candidate keyword strings" (Li, Column 6 Line 40 through Column 9 Line 35), "said bit vector having a bit position for each symbol in an alphabet and having bits set for bit positions corresponding to at least one symbol representing the first symbol of a word in said one or more candidate keyword strings" (Li, Column 6 Line 40 through Column 9 Line 35), "said one or more bit vectors for use in comparing an input bit vector with said

Art Unit: 2162

one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings" (Li, Column 8 Line 51 through Column 9 Line 36); and

"storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database" (Li, Column 7, Line 1-3, i.e. "Signature Vector" and Li, Figure 2, "Store pointers to Lexicon Entries in Bucket Address Table" 240).

Claim 18 is rejected on the same basis as claim 17.

As per claim 21, Welch in view of Li is directed to "a method for incremental keyword search on a wireless user device" (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data; Figure 1: 20*) and teaches the limitations:

"receiving an input keyword string comprising one or more words comprising one or more symbols" (Li, Column 6 Line 10-21, Column 6 Line 40 through Column 9 Line 35);

"creating a bit vector based at least in part on said input keyword string" (Li, Column 6 Line 40 through Column 9 Line 35), "said bit vector having a bit position for each symbol in an alphabet and having bits set for positions corresponding to at least

one symbol representing the first symbol of a word in said input keyword string" (Li, Column 6 Line 40 through Column 9 Line 35);

"comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors" (Li, Column 8 Line 51 through Column 9 Line 36);

"applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors" (Li, Column 9 Line 58 through Column 13 Line 62); and

"presenting any matching candidate keyword strings" (Li, Figure 2, "Output Final Candidate List" 155).

Claim 24 is rejected on the same basis as claim 16.

As per claim 25, Welch in view of Li is directed to "a method for comparing keyword strings on a wireless user device" (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data*; Figure 1: 20) and teaches the limitations:

"determining a relative frequency of use for at least one symbol in a language (Li, Column 7 Line 4-40, i.e. "frequency table");

"assigning a statistical weighting" (*A counter is accumulated ...*) "to said at least one symbol based at least in part on a relative frequency of use of said at least one symbol" (Li, Column 7 Line 4-40);

“assigning each of said at least one symbol to one of a plurality of groups” (Li, Column 7 Line 4-40, “first group”); and

“comparing a first keyword string and a second keyword string based at least in part on whether at least one symbol of said first keyword string is assigned to the same group as at least one corresponding symbol of said second keyword string” (Li, Column 8 Line 51 through Column 9 Line 36).

As per claim 26, Welch in view of Li is directed to the method of claim 25 and teaches the limitations:

“wherein said assigning further comprises assigning each of said at least one symbol to one of a plurality of groups so as to minimize the difference between the sums of statistical weightings for symbols comprising each group in said plurality of groups” (Li, Column 7 Line 4-40, *groups*).

As per claim 27, Welch in view of Li is directed to the method of claim 25 and teaches the limitation:

“wherein said relative frequency of use comprises the relative frequency of use of symbols in the first character of words in said language” (Li, Column 7 Line 4-40).

As per claim 28, Welch in view of Li is directed to “a method for creating a keyword string database on a wireless user device” (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20*

Art Unit: 2162

are configured to determine whether one or more keywords or other criteria are present in the textual data; Figure 1: 20), and teaches the limitations:

“determining one or more candidate keyword strings to store in said database (Li, Column 6 Line 40-50, i.e., valid lexicon strings (such as legal and correct city names).....);

“creating one or more bit vectors based at least in part on said one or more candidate keyword strings” (Li, Column 6 Line 40 through Column 9 Line 35), “each bit of said one or more bit vectors corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to the first symbol of a word in said one or more candidate keyword strings being set” (Li, Column 6 Line 40 through Column 9 Line 35), “said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings” (Li, Column 8 Line 51 through Column 9 Line 36); and

“storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database” (Li, Column 7, Line 1-3 and Li, Figure 2, Store pointers to Lexicon Entries in Bucket Address Table 240).

As per claim 29, Welch in view of Li is directed to “a method for incremental keyword search on a wireless user device” (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are*

configured to determine whether one or more keywords or other criteria are present in the textual data; Figure 1: 20) and teaches the limitations:

“submitting an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string” (Li, Column 6 Line 10-21, Column 6 Line 40 through Column 9 Line 35); and

“receiving in response to said submitting at least one candidate keyword string where the first symbol of each word in each candidate keyword string is comprised by a group comprising said one or more symbols” (Li, Column 8 Line 51 through Column 9 Line 36).

As per claim 32, Welch in view of Li is directed to “a method for incremental keyword search on a wireless user device” (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data; Figure 1: 20)* and teaches the limitations:

“receiving an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string” (Li, Column 6 Line 10-21, Column 6 Line 40 through Column 9 Line 35);

“creating a bit vector based at least in part on said input keyword string, each bit corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to said one or more symbols being set” (Li, Column 8 Line 51 through Column 9 Line 58);

"comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors" (Li, Column 8 Line 51 through Column 9 Line 36);

"applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors" (Li, Column 9 Line 58 through Column 13 Line 62); and

"presenting any matching candidate keyword strings" (Li, Figure 2, "Output Final Candidate List" 155).

Claim 35 is rejected on the same basis as claim 16.

As per claim 36, Welch in view of Li is directed to "a method for creating a keyword string database on a wireless user device" (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data; Figure 1: 20*) and teaches the limitations:

"determining one or more candidate keyword strings to store in said database" (Li, Column 6 Line 40-50, i.e., *valid lexicon strings (such as legal and correct city names).....*);

"creating one or more bit vectors based at least in part on said one or more candidate keyword strings" (Li, Column 6 Line 40 through Column 9 Line 35), "each bit of said one or more bit vector corresponding to one or more symbols in an alphabet, bits

Art Unit: 2162

having a bit position corresponding to a symbol of a prefix of a word in said one or more candidate keyword strings being set" (Li, Column 6 Line 40 through Column 9 Line 35), "said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings" (Li, Column 8 Line 51 through Column 9 Line 36); and

"storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database" (Li, Column 7, Line 1-3, i.e., *Signature Vector* and Li, Figure 2: *Store pointers to Lexicon Entries in Bucket Address Table* 240).

As per claim 37, Welch in view of Li is directed to "a method for incremental keyword search on a wireless user device" (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data; Figure 1: 20*) and teaches the limitations:

"submitting an input keyword string comprising one or more words comprising one or more symbols" (Li, Column 6 Line 10-21, Column 6 Line 40 through Column 9 Line 35); and

"receiving in response to said submitting at least one candidate keyword string where a prefix of a word of a matching candidate keyword string comprises at least one

Art Unit: 2162

symbol that belongs to the same symbol group as the corresponding symbol of the corresponding word in said input keyword string" (Li, Column 8 Line 51 through Column 9 Line 36).

As per claim 40, Welch in view of Li is directed to "a method for incremental keyword search on a wireless user device" (Welch, Paragraph 0026, i.e., *In further embodiments, the broadcast media receiver 10 and/or the wireless terminal 20 are configured to determine whether one or more keywords or other criteria are present in the textual data; Figure 1: 20*) and teaches the limitations:

"receiving an input keyword string comprising one or more words comprising one or more symbols" (Li, Column 6 Line 10-21, Column 6 Line 40 through Column 9 Line 35);

"creating a bit vector based at least in part on said input keyword string" (Li, Column 6 Line 40 through Column 9 Line 35), "each bit corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to a prefix of a word in said one or more symbols being set" (Li, Column 6 Line 40 through Column 9 Line 35);

"comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors" (Li, Column 8 Line 51 through Column 9 Line 36);

"applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors" (Li, Column 9 Line 58 through Column 13 Line 62); and

"presenting any matching candidate keyword strings" (Li, Figure 2: *Output Final Candidate List 155*).

Claim 43 is rejected on the same basis as claim 16.

Claim 45, 46, 54, 57, 60, and 61 are rejected on the same basis as claim 1, 2, 10, 13, 16, and 17 respectively.

Claim 62, 65, 68, 69, 70, 71, 72, 73, 76, 79, 80, 81, 84, 87, 89, 90, 98, 101, 104, 105, 106, 109, 112, 113, 114, 115, 116, 117, 120, 123, 124, 125, 128, 131, 133, 134, 142, 145, 146, 147, 150, 151, 152, 153, 154, 155, 158, 159, 160, 163, 165, 166, 174, 177, 178, 179, 182, 183, 184, 185, 186, 187, 190, 191, 192, and 195 are rejected on the same basis as claim 18, 21, 16, 25, 26, 27, 28, 29, 32, 16, 36, 87, 40, 16, 1, 2, 10, 13, 16, 17, 18, 21, 16, 25, 26, 27, 28, 29, 32, 16, 36, 37, 40, 43, 1, 2, 13, 16, 17, 18, 16, 25, 26, 27, 28, 32, 16, 36, 40, 16, 1, 2, 13, 16, 17, 21, 16, 25, 26, 27, 28, 32, 16, 36, 40, and 16 respectively.

10. Claim 3-9, 47-53, 91-97, 135-141, and 167-173 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Welch and further in view of Braun (U.S. Patent Application Publication Number 2004/0064787).

Referring to claim 3, Li in view of Welch teaches that bit vectors of claim 1 comprises at one bit that represents an non-alphanumeric symbol but does not explicitly disclose the limitation: "wherein said non-alphanumeric symbol indicates an e-mail address".

However, Braun teaches the limitation:

"wherein said non-alphanumeric symbol indicates an e-mail address" (Braun, et al., Paragraph 0049). Braun teaches a method and system for using a digital pen, wherein non-alphanumeric symbols are used to indicate a serial number or a type of form (Braun, et al., Paragraph 0049, i.e. "Additionally, non-alphanumeric characters such as special characters or symbols may be used

to enable the back end application to recognize the unique form indication or serial number.”). At the time the invention was made, it would have obvious to a person of ordinary skill in the art to add the feature of using non-alphanumeric symbols to represent other data such as a serial number, as taught by Braun et al, to the method and system of Welch in view of Li so that, in the resultant method and system, the non-alphanumeric symbol(s) would indicate an email. One would have been motivated to do so in order to simply facilitate search operations.

Claims 4-9 are rejected on the same basis as claim 3. Braun teaches a method and system for using a digital pen, wherein non-alphanumeric symbols are used to indicate a serial number or a type of form (Braun, et al., Paragraph 0049, i.e. “Additionally, non-alphanumeric characters such as special characters or symbols may be used to enable the back end application to recognize the unique form indication or serial number.”). As such, using symbols to represent/indicate other data, including a mobile number, a wired number, a paper mail address, a cost ranking, a quality ranking, a cuisine or the like, are taught by Braun.

Claims 47-53 are rejected on the same basis as claims 3-9 respectively.

Claims 91-97 are rejected on the same basis as claims 3-9 respectively.

Claims 135-141 are rejected on the same basis as claims 3-9 respectively.

Claims 167-173 are rejected on the same basis as claims 3-9 respectively.

Art Unit: 2162

11. Claim 11-12, 14-15, 19-20, 22-23, 30-31, 33-34, 38-39, 41-42, 55-56, 58-59, 63-64, 66-67, 74-75, 77-78, 82-83, 85-86, 99-100, 102-103, 107-108, 110-111, 118-119, 121-122, 126-127, 129-130, 143-144, 148-149, 156-157, 161-162, 175-176, 180-181, 188-189, and 193-194 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Welch and further in view of Albornoz et al. (hereinafter "Albornoz") (U.S. Patent Application Publication Number 2004/0260929).

Referring to claim 11, Li in view of Welch as applied to claim 10 above does not explicitly disclose the limitation: "further comprising preempting said method after a predetermined amount of time".

However, Albornoz teaches the limitation:

"further comprising preempting said method after a predetermined amount of time" (Albornoz, Paragraph 0054). Albornoz teaches a method and system for recovering data object annotations, wherein a search is ended/preempted after a predetermined amount of time (Albornoz, Paragraph 0054, i.e., *The search continuation a criterion is evaluated 1507 according to a predetermined plan and if the criterion is met, the search continues, otherwise, the search is ended 1508. An example continuation is to perform the search continually during a predetermined period of time...*").

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to add the feature of preempting/ending a search after a predetermined period of time, as taught by Albornoz to the method and system of Welch in view of Li so that the resultant method and system would comprise preempting the

Art Unit: 2162

method of claim 10 after a predetermined period of time. One would have been motivated to do so in order to run the search at regular intervals (Albornoz, Paragraph 0053, i.e., *In an alternative embodiment of the system (Fig. 15), the search process may run at regular intervals.*).

Referring to claim 12, aborting/preempting a search process or any other process after a predetermined amount of time (two seconds or three seconds or whatever amount of time) is taught by Albornoz as applied to claim 11.

Claims 14-15, 19-20, 22-23, 30-31, 33-34, 38-39, 41-42, 55-56, 58-59, 63-64, 66-67, 74-75, 77-78, 82-83, 85-86, 99-100, 102-103, 107-108, 110-111, 118-119, 121-122, 126-127, 129-130, 143-144, 148-149, 156-157, 161-162, 175-176, 180-181, 188-189, and 193-194 are rejected on the same basis as claims 11 and 12 respectively.

12. Claim 44, 88, 132, 164, and 196 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Welch and further in view of Vagonzzi (U.S. Patent Number 6499033).

Referring to claim 44, Li in view of Welch is directed to a method for incremental keyword search, the method comprising, receiving an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string (Li, Column 8 Line 51 through Column 9 Line 36). However, Li does not explicitly disclose the limitation: "receiving a hierarchy, elements

of said hierarchy comprising intermediate nodes and leaf nodes representing one or more keyword strings comprising one or more words comprising one or more symbols” and “searching said hierarchy bit vectors for a match with said input keyword string, said searching comprising, for each said elements of said hierarchy: saving input keyword; applying a logical “AND” operation to the bit vector of the element and a bit vector based at least in part on said input keyword string, said applying producing a result”.

On the other hand, Vagonzzi teaches a database method and apparatus using hierarchical bit vector index structure comprising:

“receiving a hierarchy, elements of said hierarchy comprising intermediate nodes and leaf nodes representing one or more keyword strings comprising one or more words comprising one or more symbols” (Vagonzzi, Figure 2, Column 5 Line 44 through Column 6 Line 10, i.e. “The indexes 30 are actually collections of keys stored in a B-tree.”);

“creating hierarchy bit vectors corresponding to said one or more keyword strings in said hierarchy” (Vagonzzi, Figure 2, Column 5 Line 44 through Column 6 Line 10, i.e. “The indexes 30 are actually collections of keys stored in a B-tree.”);

“searching said hierarchy bit vectors for a match with said input keyword string” (Vagonzzi, Column 10 Line 40 + , i.e. “Query Processing the Indexes”), “said searching comprising, for each of said elements of said hierarchy: saving said input keyword string; applying a logical “AND” operation to the bit vector of the element and a bit vector based at least in part on said input keyword string” (Vagonzzi, Column 11, Line 1-27, i.e. “ then searches the appropriate index for those target keys, starting with

Art Unit: 2162

the lowest key.....), "said applying producing a result" (Official Note: a search always returns a result); "if said result is nonzero, removing from said input keyword string any words in said input keyword string that are prefixes of words in the element" (...If no key is found, a bit vector of all zeros is returned. If a matching key is found in the index, then the associated link is used to obtain a bit vector for that key...."); "if said input keyword string is empty, adding said element to a list of matched items" ((...If no key is found, a bit vector of all zeros is returned. If a matching key is found in the index, then the associated link is used to obtain a bit vector for that key...."); and "restoring said input keyword string; and rendering said list of matched items" (Vagonzzi, Column 11, Line 1-27).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the method and system which employ both bit vectors and a tree hierarchy as taught by Vagonzzi with the method and system of Welch in view of Li so that the combined method and system would accommodate bit vectors in a tree hierarchy and logical searches into the trees could be performed. One would have been motivated to do so in order to *"provide a method and apparatus for managing large amounts of data in a manner that provides the following benefits: 1. Very fast query response; 2. Fast Update response; 3. Support for"* (Vagonzzi, Column 3, Line 7-26).

Claim 88, 132, 164, and 196 are rejected on the same basis as claim 44.

Art Unit: 2162

13. Claim 197- 206 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Ronchi et al., (U.S. Patent Number 6496836).

Referring to claim 197, Li teaches assigning groups based on frequency of bit vectors (Li, Column 7 Line 4-40, "groups") and compares groups based on signature vector. But Li does not explicitly disclose assigning at least one symbol to each group and comparing keywords based on said symbol (s). However, Ronchi et al. teaches a method and system for symbol-based memory language, wherein symbols are assigned to a plurality of groups (Ronchi et al, Column 8 Line 32-67 and Column 3 Line 39-44) and based on the symbol selected, a caller is directed to a particular group of communication handlers (Ronchi et al., Column 3 Line 39-44).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to add the feature of employing symbols to groups and using said symbol(s) to channel a caller to a group of handlers based on said symbol(s), as taught by Ronchi et al., to the method and system of Li, which compares bit-vectors which represent strings at least in part based on groups of different bit vector frequencies, so that the resultant method and system would comprise assigning at least one symbol to each group and comparing keywords based on said symbol (s). One would have been motivated to do so in order to "find a way to record information pertaining to their customers quickly, and to access this information consistently, without delay, and in a readily understandable format in order to best satisfy the expectations of their customers." (Ronchi et al. Column 2, Line 34-41)

Art Unit: 2162

Referring to claim 198, Li in view of Ronchi et al. as discussed above in regard to claim 197 above discloses the invention as claimed. Li in view of Ronchi et al. teaches the method of claim 197 wherein said plurality of groups corresponds with a telephone keyboard symbol grouping (Ronchi et al., Column 10 Line 1-15).

Claim 199-200, 201-202, 203-204, and 205-206 are rejected on the same basis as claim 197-198 respectively.

Art Unit: 2162

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Myint whose telephone number is (571) 272-5629. The examiner can normally be reached on 8:30AM-5:30PM Monday-Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-5629.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dennis Myint

Examiner

AU-2162


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